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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE REPORTER

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THE OFFICE OF MYCOLOGY AND DISEASE SURVEY

Volume X July 15, 1926 Number 3

The preliminary report which follows, concerning investigations on witches' broom of potatoes, was submitted for publication in the Reporter by P. A. Young and H. E. Morris of the Montana Experiment Station.

POTATO WITCHES' BROOM IS A TRANSMISSIBLE DISEASE

(A Preliminary Report)

P. A. Young and H. E. Morris

Potato witches' broom is one of the more recently discovered degeneration diseases. About ten per cent of the plants in a Jersey Peachblow plot showed this disease. Even plants with large vines which exhibited the disease in only mild form produced no tubers of commercial size. The field symptoms of witches' broom observed in Bliss Triumph, Jersey Peachblow, and Earliest of All were similar to those described by Hungerford and Dana. (Hungerford, C. W. and B. F. Dana. Witches' broom of potatoes in the northwest. Phytopath. 14: 372-383. 1924.) The experiments reported here were carried out in the greenhouse of the Montana Agricultural Experiment Station at Bozeman, Montana.

Progeny of thirteen witches' broom field plants were grown in the greenhouse; with one possible exception, all of the 89 tubers grown from them so far have produced witches' broom plants. In many tests by growing witches' broom and normal potatoes in the same pots, no evidence of soil or root contact transmission of the disease was secured.

By using the method of cork borer plug inoculations described by Goss (Goss, R. W. A simple method of inoculating potatoes with the spindle-tuber disease. Phytopath. 16: 233. 1926), potato witches' broom was transmitted from two sources of the disease in Jersey Peachblow to eight normal Bliss Triumph and three normal Perfect Peachblow plants. In similar tuber plug inoculations, Bliss Triumph witches'broom was transmitted to two normal Bliss Triumph plants. Many similar tuber plug grafts failed to produce current season symptoms in the resulting vines.

Witches' broom was transmitted by inarch-grafting a Bliss Triumph witches' broom scion onto a normal Perfect Peachblow stock and by side-grafting a Jersey Peachblow witches' broom scion into a normal Bliss

Triumph stock. Many other stem grafts failed to give positive evidence of disease transmission. Inarch-grafting was the most satisfactory form of grafting used. In the cases of transmission described above, witches' broom symptoms appeared within 29-80 days after inoculation. No current season symptoms resulted from the experiments to transmit witches' broom by leaf mutilations, by pricking expressed juices into stems and leaves, or by applying expressed juices to cut surfaces of tubers.

Although only 15 of the total of 116 attempts to transmit witches' broom gave positive symptoms, testing the progeny of the vines that gave negative results may reveal other cases of transmission. Further extensive symptom and transmission studies are in progress.

In most cases of witches' broom in Bliss Triumph, Jersey Peachblow, Perfect Peachblow, and Idaho Rural, the upper leaflets show marginal yellow chlorosis as the first symptom of the disease; later, red often becomes blended with the yellow. The yellow margins of the leaves and tops of stems remain visible throughout the season.

Plants of the above varieties having severe witches' broom show the following field symptoms; vines are greatly dwarfed and usually rigidly upright, but may be prostrate in the greenhouse; many of the leaves are simple instead of compound; margins of the upper leaves are usually yellow and often red to purple late in the season; leaflets are often dwarfed and often rolled, curled, or rugose; stems are typically spindly with elongated, non-angular internodes and swollen nodes; stems have numerous axillary branches and bear many aerial tubers with leafy eyes, even in their tops; tubers are less than two centimeters in diameter and are very numerous, subterranean ones proliferating and forming chains of tubers; tubers have a short or no dormancy period and produce many short, spindly sprouts within 20 cm. of the bases of the old plants late in the season. Witches' broom plants produce from a few to a hundred tubers, depending upon the severity of the disease.

In mild witches' broom observed in these varieties late in the season, the vines were not dwarfed. The top leaves and stems exhibited typical yellowing, dwarfed leaflets, and cylindrical stems; the lower leaves were nearly normal. The lower halves of the stems bore many aerial tubers and numerous spindly new sprouts appeared near the bases of the old vines late in the season. Few of the numerous tubers produced by such vines were more than two centimeters in diameter; they produced typical witches' broom plants when grown in the greenhouse. One large, supposedly normal Bliss Triumph plant in the greenhouse retained its normal appearance for six weeks and then developed prominent witches' broom symptoms. It was the only one of the 300 pots of potatoes grown by the Horticulture Department that showed this disease.

Three hills of Bliss Triumph and Jersey Peachblow potatoes in the field appeared to have witches' broom, but lacked two important symptoms of the disease; they were entirely prostrate and the leaves showed no discolorations. The vines were much dwarfed and showed degeneration in a severe form. This disease was clearly unlike typical witches' broom in the field, although it could not be distinguished from some of the witches' broom plants in the greenhouse. When the symptoms are better understood, perhaps a new name for this disease will be needed.

A common greenhouse symptom of witches' broom in Bliss Triumph and Jersey Peachblow is the formation of pubescent, filamentous branches 1/4 to 2 mm. in diameter and 1/2 to 10 cm. long from any of the nodes of the stems. These slender, even thread-like branches are often much

branched, are leafless or bear clusters of leaves at their tips, and frequently bear terminal tubers. Single plants may bear as many as a hundred of these filamentous stems; many of them grow from the bases of the old vines.

Severe witches' broom causes extreme dwarfing. Some of the potted plants in the greenhouse are only 5 to 15 cm. tall at the age of 5 months; most of their leaves are simple. On one of the plants, the stems are only 1/2 to 1 mm. in diameter and the leaves are only 1 to 2 mm. long. Witches' broom plants do not die in the greenhouse like normal plants. Some senescent vines produced juvenile branches in their tops.

Parts of the tops were cut off from some of the inoculated plants that had failed to show current season symptoms when they were 8 to 10 weeks old. The old stems of two of these plants later produced typical spindly witches' broom vines.

The lower leaves of old witches' broom plants are often rolled, brittle, and yellow between the main veins. These are typical leaf roll symptoms, but their presence does not necessarily mean that the leaf roll disease occurs as a combination in such cases; only the lower leaves show such symptoms. Crinkle mosaic occurs in combination with the progeny of some of the witches' broom plants.

Two definitions of symptoms used at Cornell University have useful applications in describing virus diseases. (a) Chlorosis is the partial failure of chlorophyll development and is a non-necrotic symptom exhibited by light green or yellow colors. Although not required by the definition, chlorosis is applied to abnormally light-colored organs that never were normally green, such as peach leaves affected with yellows. Witches' broom potato plants are more or less chlorotic and the margins of the upper leaves are often yellow chlorotic. The mottled areas in mosaic leaves represent chlorotic spots. (b) Paranecrosis represents protoplasmic disorganization preceding actual death of cells; yellowing is a paranecrotic symptom. A characteristic symptom of leaf roll in Bliss Triumph, Netted Gem, Irish Cobbler, and Green Mountain is the appearance of yellow regions between the main veins of mature leaves that simultaneously or later show rolling; Bliss Triumph leaves in the greenhouse often become whitish-yellow. These rolled leaves die before normal leaves of the same age. The interveinal yellowing of leaf roll is probably best called a paranecrotic symptom. The chlorotic and yellowed leaves of plants affected with these virus diseases often remain alive for weeks while they exhibit little chlorophyll.

POTATO LATE BLIGHT IN FLORIDA

"Foliage infection found in all fields. Good commercial control was obtained where the field was properly dusted or sprayed, and in most of the fields the actual loss was small. Several fields which were not dusted were completely killed about four weeks before maturity with at least a 50 per cent decrease in yield.

"Considerable damage was caused in the new crop in transit when the tubers were shipped wet and muddy. They were placed in double headed barrels and never dried out. The early shipments from the Federal Point section were the worst but the condition persisted throughout the season." (Gratz, June 1)

POTATO DISEASES IN ARIZONA

"Black scurf (Corticium vagum) more prevalent than in average year. Chief damage done in reduction in stand and stem lesions. Lesions on tubers not abundant. Loss difficult to estimate, probably 3 per cent."

"Blackleg (Bacillus phytophthorus) more prevalent than in average year. Forty-acre field from certified seed showed one-fourth per cent infection. Fields from other seed showed from a trace to 20 per cent loss by decay of tubers in field."

"Scab (Actinomyces scabies) found in plants from untreated seed in Pima and Maricopa counties, varying from slight to abundant. Loss, probably 2 per cent."

"Sunburn - Cool, moist weather followed by hot weather and conditions favorable to excessive transpiration caused a more or less severe burning of the foliage in the majority of Pima and Maricopa county potato fields. The reduction in yield is conservatively estimated at 10 per cent." (Streets, June 15)

CACONEMA RADICICOLA ON PEAS IN WISCONSIN

On June 1 a one and one-half acre field of Green Admiral peas on very light sandy loam soil at Sauk City, Wisconsin, was observed by R. E. Vaughan and M. B. Linford to be affected with a nematode disease which caused severe injury. Vaughan stated that "The diseased plants were not more than 3 or 4 inches in height, while uninfected plants were 10 to 14 inches." Specimens of affected plants were sent to Dr. N. A. Cobb of the Bureau of Plant Industry, who determined the organism to be the root-knot nematode, Caconema (Heterodera) radicicola. So far as is known this is the first report of a nematode attacking a field crop in Wisconsin, although, according to Doctor Cobb, Caconema radicicola occurs as far north under sufficiently favorable conditions, but infrequently. Later (July 1), Vaughan reported the pest was found on bindweed (Polygonum convolvulus) and pigweed (Chenopodium album), in the same field.

WESTERN YELLOW BLIGHT OF TOMATOES SEVERE IN ARIZONA AND OREGON

Arizona: General throughout plantings in Pima and Maricopa Counties, causing death of plants of all sizes. Losses vary from 10 per cent to 50 per cent of plants in all fields inspected with average about 20 per cent. The disease is still attacking new plants and losses will go higher. (Streets, June 15)

Oregon: This disease has made its appearance this spring in great severity throughout the state including western Oregon sections like the Willamette Valley where the trouble ordinarily is not seen. The trouble may be associated with the spells of severely hot and dry weather which we have experienced this spring. (Barss, July 1)

TOMATO WILT AND MOSAIC IN KANSAS

"Tomato wilt (Fusarium lycopersici) is showing up earlier than usual this year on susceptible varieties, due probably to the extremely hot weather experienced during May and the early part of June. Promises to be a bad wilt year all over the state. Resistant varieties standing up very well. First noted on June 7."

"Mosaic is extremely severe in several fields around Manhattan. Eighty per cent of some fields heavily mosaiced, plants very sharply mottled, and setting no fruit. Very evidently spread by handling plants when pulling from hot-bed and setting. Morning plantings free or nearly so, gradually increasing up to noon until 100 per cent of plants are mosaiced. Immediately after dinner, after washing hands, almost mosaic free until a few scattering plants are found with mosaic, then increasing in severity rapidly until 100 per cent infection is reached. Several clear cut cases of this kind have been traced to the hot-bed." (White, June 23)

POWDERY MILDEW OF CANTALOUPE

A note in the Division Letter of the Fruit and Vegetable Division, Bureau of Agricultural Economics, for July 9 states that, according to C. E. Schultz, the average yield of cantaloupes in the Imperial Valley this season was probably not more than 110 crates per acre. The yield usually averages 160 crates. The reduction is attributed to the severe attack of powdery mildew.

In another paragraph in the same issue E. E. Conklin reports that

there was some mildew in the Arizona cantaloupe sections, but it did not spread and become of general importance as in the Imperial Valley, and apparently was not a factor.

BUNT CONTROL WITH COPPER CARBONATE

Delaware: Counts were first made on demonstrations and experimental plots June 21. All untreated grain is showing heavy infection with evidence that conditions were very favorable for infection last fall. Controls in commercial plantings showing trace to 25 per cent of smutty heads. Artificial inoculation, 1 gram spores to 100 grams of seed, showing 53 per cent smutty heads. Seed treatments have proved very successful where moderate infection of grain occurred. (Adams, July 1)

Virginia: Less prevalent than last year because of extensive use of copper carbonate seed treatment. This has given satisfactory control. (Fromme, July 1)

Colorado: We checked our copper carbonate treatments and find some very interesting data. The farmers who treated, using about four ounces of this copper carbonate, and planted early had very little smut against 25 per cent in fields using no treatment. However, the treated and late plantings showed from 12 to 35 per cent smut. The 35 per cent was treated with copper carbonate and planted late in October on ground which last year had lots of smut. The observations and smut counts were made in Weld, Logan, Phillips, Yuma, and Washington Counties. Two of us were out for one week and visited on an average of 8 farms a day and made the smut counts and checked up on the treatments. We also visited many fields which had not been treated and found as high as 50 per cent smut. (Lungren, June 29)

Arizona: Prevalence and losses about same as last year. Use of copper carbonate dust increasing, and has been very effective, although often crudely applied to seed. One 10-acre field of untreated Sonora wheat showed 50 per cent smutted heads (Maricopa County). (Streets, June 15)

REPORTS ON WHEAT STEM RUST

Virginia: Appeared as crop was ripening and with possible exception of scattered localities, did little injury. (Fromme, July 1)

Illinois: Where is our old friend, stem rust, this season? To date, we have not found it in Illinois. (Tehon, June 14)

Arkansas: Heavier infestations than usual have been noted. The disease around Fayetteville is more common than leaf rust, a rather odd condition. Is this due to the abnormally cool, moist weather prevalent in the early growing season, this year? At the time of last field observations, June 16, wheat was ready to cut, but telia were not to be observed. (Rosen, July 1)

Missouri: Little or no black stem rust on wheat has been observed. (Scott, June 23)

Recent rains will favor the development of the rusts but the wheat and oats are both winter crops and both will be harvested before there can be much damage. (Archer, June 28)

North Dakota: Traces were found in winter wheat on June 11. Owing to unfavorable weather conditions stem rust has not developed to any considerable extent from the original infestations. (Brentzel, July 1)

Colorado: The winter wheat will be ready to cut in about a week in eastern Colorado. On our recent survey in that section we were unable to find any stem rust. Our spring wheat is now in the milk stage. We have been unable to find any stem rust to date. We did find some on the wild grasses spreading from infected barberries. (Lungren, June 29)

Arizona: Abundant in Maricopa County, infection ranging from severe to slight, average moderate. Aggravated by cool, wet weather in March and April. Reduction in yield varying from nothing to 20 per cent. Average about 3 per cent. (Streets, June 15)

California: A real North Dakota epidemic of stem rust occurred in California this year, completely destroying much of the wheat in the southern part of the state. Some of the selections in Prof. Mackie's nursery proved very resistant, the most resistant selections coming from Early Defiance crosses. Pusa No. 4 also transmits resistance in hybrids in a satisfactory degree.

The classification nursery grown by Mr. Florell was nearly destroyed by rust, but rust notes had been obtained on all varieties. Marquis was one of the most resistant, this variety and Kota, Kanred, and Erivan having less than 5 per cent infection. Most of the earlier Australian and Indian varieties also escaped rust. (J. A. Clark, Cereal Courier 18: 142. June 30, 1926)

LEAF RUST OF WHEAT

Delaware: Trace of infection showing May 6 but no rapid development until wheat was in blossom. The progress and spread was slow and such as to be no factor in sizing up of grains. Much more general infection than last year. (Adams, July 1)

Virginia: Less prevalent and destructive than normal. Infection late in appearing and wheat matured before serious injury occurred. (Fromme, July 1)

Arkansas: Much less than usual, but developing to some extent on late maturing varieties. Coker's Blue Stem, Red May, Alabama Blue Stem, and other early maturing varieties escaped leaf rust to a considerable degree. (Rosen, July 1)

Missouri: Leaf rust infection is lighter than usual. (Scott, June 23)

North Dakota: General infection in fields about Fargo, Valley City, Jamestown, Bismark, and Mandan. (Brentzel, July 1)

Colorado: On our recent survey in eastern Colorado we found a sprinkling of leaf rust, which will do no damage. (Lungren, June 29)

Arizona: Scattering infections in Maricopa County, ranging from moderate to slight. Favored by cool, wet weather in March and April. Reduction in yield varying from nothing to 6 per cent. Average about one-half per cent. (Streets, June 15)

STRIPE RUST (PUCCINIA GLUMARUM) ON WHEAT

The Survey has little data, but it would appear that infection with stripe rust on the Pacific Coast and in the Northwest is rather heavier than usual. It would be desirable to have more definite information concerning the occurrence of stripe rust, and leaf rust (Puccinia triticina) as well.

APPLE BLOTCH (PHYLLOSTICTA SOLITARIA) IN MICHIGAN

"Specimens of blotch were received this spring from Riverside. Upon investigation it was found that the infected trees had been set in the spring of 1924 and that all trees

were badly infested when received. There was a small amount of infection on the growth of 1924, but the growth of 1925 shows no signs of blotch and this season's growth is also clean." (Bennett, July 1)

CEDAR RUST (GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE) SEVERE IN NEBRASKA AND KANSAS

Nebraska: Heavy infection reported from commercial orchards. Fruit infection causing considerable damage. This is the first year in the past five that there has been any serious fruit infection. Usually there is a medium to heavy infection on leaves and only a trace on fruit. This year has been extremely dry, and development of fruit and leaves is somewhat retarded. (Goss, July 15)

Kansas: Heavy infection on apples this year, causing defoliation upon susceptible varieties. Wealthy and Jonathan are the two most susceptible varieties in Kansas. Many others show lighter infections. Infection so severe on Wealthy trees that they appear brown as far as they can be seen. Will seriously interfere with normal twig growth. (White, June 23)

APPLE SCAB (VENTURIA INAEQUALIS)

Reports from Arkansas, Wisconsin, and Nebraska state that scab is of very little importance this year. In North Carolina, according to Fant, the disease is rather prevalent on susceptible varieties, and Evans reports it to be prevalent in South Dakota also. Other reports follow.

Connecticut: First ripe ascospores found April 28. First report of parasitic stage on leaves reported June 1. No special complaint of injury so far. (Stoddard, July 1)

Virginia: The crop in the chief commercial sections is practically free from fungous injury. In outlying sections, however, especially in southwest Virginia, scab is causing considerable injury in poorly sprayed orchards. Local rains account for scab prevalence in these sections. (Fromme, July 1)

Ohio: In only one orchard section in central Ohio is scab a serious factor. In the main, there is very little elsewhere, and very dilute sprays are being used to handle it. (Young, July 1)

Michigan: Scab infection started later than usual. The fruit is generally fairly clean, but in many orchards, there has been a heavy foliage infection due to the recent weather conditions favorable for scab development. (Bennett, July 1)

Minnesota: A trace of scab was found on June 20 in a nursery row at Faribault on Virginia crab. None has been found to date in orchards. (Sect. Plant Path., July 1)

Oregon: Far less troublesome than in 1925. Present in western Oregon as usual but in amounts below the average season. (Barss, July 1)

APPLE BLIGHT (BACILLUS AMYLOVORUS)

Virginia: First appearance - Crozet, May 15, Mt. Jackson, May 27. More severe in southwestern section near Tennessee border than elsewhere. Of minor importance for state as a whole. Chiefly twig blight, fruit blight seen in Patrick County. (Fromme, July 15)

Kentucky: Quite extensive blossom and twig blight injury. (Valleau, July 1)

Ohio: Fireblight is very severe this year in southwestern Ohio. Very little showing up in any other part of the state. (H. C. Young, July 1)

Michigan: Blossom blight was serious in only a relatively small number of orchards. Twig blight is becoming rather destructive in the southeastern and the northern parts of the state. (Bennett, July 1)

Wisconsin: Serious outbreak getting under way. First seen on twigs, Milwaukee County, June 2. More in Bayfield County than ever before. (Vaughan, July 1)

Minnesota: First observed June 2 in Hennepin County after the first rain following a long dry period. Abundant at the present time but doing less damage than last year, due, apparently to the hot dry weather. (Sect. Plant Path., July 1)

Missouri: On apples there is a severe infection of twig and branch blight caused by Bacillus amylovorus. This is widespread in the northern part of the state. No data is available yet for the rest of the state. According to observers this is the third successive year of serious blight in apples. (Archer, June 28)

Kansas: Not nearly as serious as in 1925, an epidemic year. Possibly accounted for by exceedingly warm weather in May or drouth of April or May, or still another possibility is the late early season conditions. (White, June 23)

Oregon: Severe blossom blight in susceptible apple varieties in eastern Oregon. No damage in Willamette and Hood River Valleys of any economic significance. (Barss, July 1)

BITTER ROT INFECTION IN VIRGINIA

"Have you anything on record to indicate that bitter rot mummies have been known to carry the fungus in viable condition over a period of two years? In a tree of Early Harvest we attached wire cages containing bitter rot mummies produced in 1924. These mummies were exposed during the summer of 1925 and through the winter of 1925-26 and on June 30 we noted infection beneath the cages. There is no other infection by bitter rot in this tree, therefore, we conclude that the infection noted was the result of spores dripping from the mummy cages upon the apples beneath them." (Schneiderhan, July 6)

STRAWBERRY DISEASE SURVEY

A. N. Brooks,
Assistant Pathologist,
Florida State Plant Board.

During May and June a survey was made of the strawberry fields near Chadbourn, North Carolina; Norfolk and Onley, Virginia; Marion, Fruitland, Salisbury, and Pittsville, Maryland; and Selbyville, Laurel, Seaford, and Bridgeville, Delaware, for the presence of such diseases as leafspots, fruit rots, and root rots. In most of the places visited continued cool, dry weather precluded the extensive development of any of these diseases. The following, however, is a brief summary of the conditions found:

Leaf spot (Mycosphaerella fragariae)

North Carolina: Not present to any great extent.

Virginia: Present to a limited extent on Missionary variety in fields near Norfolk and somewhat more abundant near Onley.

Maryland: Present to a moderate degree on Gandy variety.

Delaware: Present in greater abundance in this area than in any other visited.

Leaf scorch (Diplocarpon earliana)

North Carolina: Found to a limited extent upon leaves of the Klondike variety, and very abundantly upon the calyces of the fruit causing the so-called "dead-caps." Some fields showed as high as 75 per cent of the caps dead.

Virginia: Found in moderate degree in fields near Norfolk and more abundantly on Heflin's Early variety near Onley.

Maryland: Found in abundance upon Gandy variety near Marion, and less abundantly upon Chesapeake near Pittsville.

Delaware: Found in slight amounts upon different varieties throughout the southern half of the state.

Leaf blight

Maryland: Gandy variety in some fields was seriously affected with a leaf disease which resembled the blight caused by Dendrophoma. The exact cause of this condition existing in Maryland has not been determined.

Powdery mildew (Sphaerotheca humuli)

Maryland and Delaware: Found to a limited extent in low, damp portions of fields where plants were in a rather succulent condition.

Root rot

Black roots and roots with the cortex rotted in small spots or entirely decayed leaving the central cylinder exposed were found on plants in all of the areas visited. This condition was of little consequence in some of the fields while in others it was of major importance.

Fruit rot occurring in the field (Isolations from fruit rotted in the field showed that Botrytis sp. was present in over 50 per cent of the cases.)

North Carolina: Small amount found in fields near Chadbourn.

Virginia: A moderate amount found around Onley.

Maryland: Found to be fairly abundant near Fruitland, Salisbury, and Pittsville but not so abundant near Marion.

Delaware: Found in great abundance near Selbyville, but less abundantly near Laurel, Seaford, and Bridgeville.

RASPBERRY DISEASES

"Raspberry anthracnose (Plectodiscella veneta) is causing much damage in plantings of small fruit growers in the neighborhood of Kansas City, Missouri. Where proper control measures were taken the disease has been successfully controlled." (Scott, June 23)

"Red raspberry mosaic found in Wisconsin on more or less plants seen, both cultivated and wild. Some beds show 70 to 90 per cent. Eradication is almost impossible. The theory of disease-free plants is all right, but how can they be obtained or kept free, with diseased wild hosts widely scattered?" (Vaughan, July 1)

"Leafcurl reported several times from Lancaster and Douglas Counties, Nebraska. Amount of infection not known. (Goss, July 15)

DOWNY MILDEW (PLASMOPARA VITICOLA) ON GRAPE IN OHIO

"Weather conditions have been very favorable for the development of downy mildew on grape. Consequently, in some sections of northern Ohio it is being controlled with difficulty. More than the average loss may be expected." (H. C. Young, July 1)

CITRUS NEMATODE (TYLENCHULUS SEMIPENETRANS) FOUND FOR FIRST TIME IN ARIZONA

"Light infestation found in two grapefruit orchards in Maricopa County, apparently not having seriously affected trees. Probably the first authentic report of this pest from Arizona. (February, 1926)." (Streets, June 15)

AN EPIPHYTOTIC OF BRAND CANKER OF ROSE CAUSED BY CONIOTHYRIUM WERNSDORFFIAE LAUBERT

Cynthia Westcott
Heckscher Research Assistant, Cornell University

On June 9, 1926 Miss Alma Waterman, Junior Pathologist, Forest Pathology, U. S. Department of Agriculture, and the writer visited the Rose Test Gardens at Cornell University, Ithaca, N. Y., and found there a severe infestation of rose canker, caused by Coniothyrium wernsdorffiae Laubert, on the climbing roses.

Since the discovery of the disease 233 plants at the Test Gardens have been examined by the writer, and at least 90 per cent infection noted. Two hundred and six plants were definitely diseased; 11 more were doubtful but gave indications of having the canker; 16 were apparently healthy. The

latter were all sweetbrier roses. On June 23, four plants, variety White Dorothy, growing in the students' garden at Cornell University, were found to have the brand canker.

This disease has been found on the following varieties:

Adelaide Moullé HW.	Freedom	Purity HW.
Aglaia	Geisha HT.	Rosa Multiflora
Aviateur Blériot HW.	Hauff	Rosa setigera
Blush Rambler HW.	Hiawatha HW.	Roserie HM.
Caroubier HW.	Lessing	Rubin HW.
Christine Wright HW.	Louise Sauvage	Ruby Queen
Coquina	Manda's Triumph	Seven Sisters
Dawson	May Queen HW.	Source d'Or HW.
Daybreak H. Nois	Memorial Rose	South Orange Perfection
Dazzling Red HW.	Minnehaha	Tausendschön HW.
Delight HW.	Miss G. Messmann	Victory HT
Dr. Huey HW.	Mosel HM.	Wartburg HM.
Evangeline HW.	Multiflora euphrosine	Wedding Bells HW.
Excelsa HW.	Multiflora grandiflora	White Dorothy HW.
Farquhar	Paradise HW.	White Rautenstrauch
Flower of Fairfield	Pink Pearl	
François Poisson HW.	Pink Roamer	

The above list is far from complete. It includes only those varieties growing in the garden for which the name could be conveniently obtained.

Thus far the brand canker has been found only on the climbing roses, although it should also be found on the Hybrid Teas and Perpetuals, according to accounts of the disease as it has occurred in other places. The examination here has not been sufficiently thorough to determine this point. Suspicious looking spots on cankers examined to date have shown only Coniothyrium fuckelii to be present on Hybrid Teas and Perpetuals. In many cases this latter fungus seems to have come in after winter killing but on several occasions cankers present on green wood have been observed.

This epiphytotic has probably been aided by the kind of winter protection given. The canes were more protected than usual during the past winter since they were wrapped in burlap as well as being laid down and having the base covered with soil. They were covered in November and unwrapped the latter part of April. At that time the gardners noticed what seemed to be unusually heavy winter injury. Some of the canes were dead at the tips and small dark spots were noted on otherwise healthy canes. No great alarm was felt, however, since most of the canes seemed vigorous. The dead parts were pruned out and the ramblers tied up on the posts. The small dark spots then rapidly became larger, many more appeared, and more canes died at the tips.

When the first visit was made to the gardens, on June 9, the disease was far advanced. Conspicuous spots were present on nearly all the canes. Some canes were completely dead, others dead for two or three feet from the tip and many others still green, with the leaves fresh, but the canes covered with spots even down onto the roots. The one year canes were primarily affected but whenever two year canes had been left in the garden the typical cankers and fungus fruiting bodies were found on these. Some of the current season's canes were brown at the base and once or twice what appeared to be young cankers were seen on these but whether due to C. wernsdorffiae remains to be seen.

Preliminary spore germination tests carried on by a graduate student in the Laboratory, Mr. Agadi, have given very interesting results which may have a bearing on the time of year when the disease is spread. (Table 1)

Table 1. Germination of spores of Coniothyrium wernsdorffiae at various temperatures.

Temp. °C.	Percentage germination After 48 hours Series I	Percentage germination After 72 hours Series II	Temp. °C.	Percentage germination After 48 hours Series I	Percentage germination After 72 hours Series II
3	0	0	18	26.5	84.7
6	0	14.2	21	17.9	17.6
9	13.9	50.6	25	0	0
12	17.2	62.9	27	0	0
15	33.1	67.9			

The spores were germinated in tap water and from 200 to 400 spores were counted in each case.

The temperature range for germination is thus seen to be very limited. Presumably widespread infection can not occur too early in the spring or after the hot weather has started.

Control. The plants were so badly diseased that there would have been slight if any show of blossoms this year. The only feasible control measure seemed to be to cut out and burn all the old canes leaving only the new growth, spraying the latter thoroughly with Bordeaux. This has been done.